

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2005.

Fourth Semester

Electronics and Communication Engineering

EC 242 --- DIGITAL ELECTRONICS

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A --- (10 × 2 = 20 marks)

1. Add -176 (decimal) to -204 (decimal); do the arithmetic in binary using 2s complement notation.
2. Construct the truth table of
$$F = (A \oplus B) \oplus (C \oplus D).$$
3. Define fan in.
4. Write down any two salient features of ECL logic family.
5. Draw a combinational logic circuit which can compare whether two bit binary numbers are same or not.
6. What is PLA?
7. How many flip flops are required to design a mod-7 up-down counter?
8. Draw a RAM cell.
9. Define Cycle.
10. Define Hazard.

11. (i) Explain the principle of pulse mode asynchronous sequential logic circuit. What are the restrictions to be laid on the input signal of a pulse mode asynchronous sequential circuit? (8)
- (ii) What is an essential hazard? Why does it occur? Suggest methods to have essential hazard free circuits. (8)
12. (a) Reduce the following switching functions using Karnaugh map :
- (i) $\Sigma m (0, 1, 2, 6, 7, 9, 12, 28, 29, 31)$ (8)
- (ii) $\pi M (2, 3, 7, 9, 11, 12)$. (8)

Or

- (b) (i) Reduce the following switching function using tabulation method.
 $\Sigma m (1, 3, 4, 7, 8, 10, 11, 13, 15)$. (8)
- (ii) Write notes on computer aided minimization of switching functions. (8)
13. (a) (i) Compare the various digital logic families. (8)
- (ii) Explain the working of a NMOS inverter. (8)

Or

- (b) Explain the working of a CMOS NOR gate.
14. (a) Design and implement a binary to Gray code converter.

Or

- (b) (i) A system of logic is to be designed which has two outputs and three inputs. One output will be TRUE if an odd number of inputs are TRUE. The other output will be TRUE if only one input alone is TRUE. Draw the truth table and write the corresponding Boolean equations. (8)
- (ii) What is PAL? Show how a PAL is programmed for the following logic function. (8)

$$X = A\bar{B}C + \bar{A}B\bar{C} + \bar{A}\bar{B} + AC.$$

15. (a) (i) Explain the working of a Ripple Counter. (8)

(ii) Write brief notes on four applications of shift registers. (8)

Or

(b) Write notes on semiconductor memories and methods of memory decoding.
